



PATENT

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Handa B. Lawrence  
(signature)

Date of signature and deposit - 03-02-07

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:	)	
GEORGE BYMA et al.	)	Group Art Unit 1771
	)	
Serial No. 10/601,615	)	
	)	Examiner Ula C. Ruddock
Filed: June 23, 2003	)	
	)	
For: VEHICLE INTERIOR TRIM	)	Confirmation No. 8851
COMPONENT CONTAINING	)	
CARBON FIBERS AND METHOD OF	)	
MANUFACTURING THE SAME	)	Attorney Docket 1-73826

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Commissioner For Patents  
P.O. Box 1450  
Alexandria, Virginia 22313-1450

DECLARATION OF GEORGE B. BYMA

Honorable Sir:

I, George B. Byma, hereby declare that:

1. Based on my personal knowledge of the vehicle industry, there has been and continues to be a long felt need in the vehicular manufacturing industry to reduce the overall weight of vehicles. The companies that I have worked for, and the competitors of the companies that I have worked for, were working on solving the need to reduce the overall weight of vehicles when I entered into the vehicle manufacturing industry in 1993. Additionally, based on my personal knowledge of the vehicle industry, there has been and continues to be a long felt need in the vehicular manufacturing industry to reduce the amounts of glass fibers that are used in vehicular components. The companies that I have worked for, and the competitors of the companies that I have worked for, were working on solving the need to reduce the

amounts of glass fibers used in vehicular components at least as early as 1993. Thus, in my opinion, there has been and continues to be a long felt need in the vehicular manufacturing industry for an alternative laminate material that is suitable for use in vehicular headliners and that addresses the desires noted above.

2. Furthermore, based on my personal knowledge of the vehicle industry, there has been and continues to be a long felt need in the vehicular manufacturing industry to recycle automotive parts at the end of their useful lives. The companies that I have worked for, and the competitors of the companies that I have worked for, were working on solving the need to recycle automotive parts as early as 1993. Thus, in my opinion, there has been and continues to be a long felt need in the vehicular manufacturing industry for an alternative laminate material that is better suited for recycling than conventional laminate materials that use glass fibers.

3. I do not believe that others skilled in the art who were working on the problems identified above would be able to solve those problems if they were familiar with the teachings of the Arthurs and the Michael references. The Michael reference teaches that "the reinforcing fiber may be a continuous strand of natural fiber selected from a group consisting of, for, example, kenaf, jute, sisal, hemp and mixtures thereof ." (See Paragraph 0017). The Michael reference then teaches that "the use of natural fibers allows for the production of an environmentally friendly product that is more readily recyclable." (see Paragraph 0017). The Michael reference further teaches that it should also be appreciated, however, that the continuous fiber strand may be a synthetic fiber such as, for example, polyester, glass, carbon, polyolefin, and any polymer known to be useful for the particular end product article, copolymers, and blends and any mixtures thereof. The Michael reference then teaches that the "specific synthetic fibers that have been found to be useful in the present invention include but are not limited to A glass, C glass, E glass, polypropylene, polyethylene terephthalate, polybutylene terephthalate and mixtures thereof." (See Paragraph 0017). Therefore, in my opinion, the Michael reference teaches that the selection of natural fibers produces a laminate material that is better suited for recycling. Note that Michael teaches carbon to be a synthetic fiber, not a natural fiber. Furthermore, the Michael

reference does not contain any teaching to the advantages of carbon fiber. Thus, I do not believe that others in the art would have been able to solve the problems discussed above given the teachings of the Michael reference.

4. To the best of my understanding, the Arthurs reference discloses a laminate that includes a polyurethane foam core layer having glass fiber reinforcement layers bonded to the sides thereof by adhesive. The Arthurs reference does not disclose that the reinforcing layers comprise carbon fibers or basalt fibers. To address this, the Examiner has combined the teachings of the Arthurs reference with the teachings of the Michael reference, which discloses an article made from natural or synthetic fiber 40 and a resinous binder 42, wherein the fiber 40 may be "a synthetic fiber such as, for example, polyester, glass, carbon, polyolefin, and any polymer." However, the Michael reference further teaches that the "specific synthetic fibers that have been found to be useful in the present invention include but are not limited to A glass, C glass, E glass, polypropylene, polyethylene terephthalate, polybutylene terephthalate and mixtures thereof." (See Paragraph 0017). The Michael reference further teaches that "the use of natural fibers allows for the production of an environmentally friendly product that is more readily recyclable." (see Paragraph 0017). There is no teaching in the Michael reference to suggest that the use of carbon fibers or basalt fibers enhances lamination strength as suggested by the Examiner. Additionally, the Michael reference does not teach that basalt fibers are superior to glass fibers in their behavior during recycling by incineration and their ability to be reclaimed and reused after the incineration of the laminate product. Because of the teachings of the Michael reference, I believe that there is no motivation to employ carbon fibers or basalt fibers rather than glass fibers in the laminate of the Arthurs reference. Therefore, I do not believe that the Arthurs reference and the Michael reference provide any motivation to employ carbon fibers or basalt fibers rather than glass fibers in the laminate of the Arthurs reference as proposed by the Examiner.

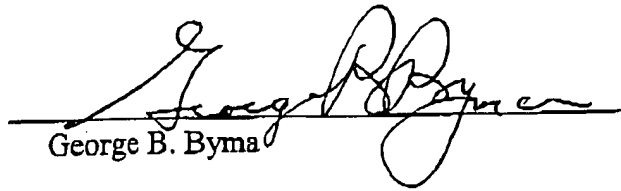
5. The basalt fibers and carbon fibers of my invention have the unexpected benefit of reuse after the incineration of the laminate product. The incineration of the

laminate product of my invention reduces the laminate product to ash and carbon fibers and/or basalt fibers. After incineration, the basalt fibers and carbon fibers may then be reclaimed from the ash and reused in another laminate product suitable for use in a headliner. Conventional headliners containing glass fiber are not easily recyclable by incineration because the glass fibers melt during the incineration process and undesirably coat the interior of the incineration equipment. Because the glass fibers melt during incineration, the glass fibers are not easily reused after the incineration of the headliner. The basalt fibers and carbon fibers of my invention will not melt during the incineration process and, therefore, do not coat and/or damage the incineration equipment. Thus, the basalt fibers and carbon fibers of my invention are superior to the glass fibers of conventional headliners in their behavior during recycling by incineration and in their ability to be reclaimed and reused after the incineration of the laminate product.

6. In November 2006, a product known as the Fiberglass-free Headliner produced by M-Tek, Inc. for the 2007 Model Year Honda Acura MDX SUV was selected as the Most Innovative Use of Plastics in the Environmental Category by the Society of Plastics Engineers (see attached press release dated November 14, 2006). To the best of my knowledge, prior to the publication of the subject application, these competitors had not offered similar laminate products. In addition to these product developments, several other competitors, upon learning of Lear Corporation's laminate product, expressed an interest in developing a laminate product to compete with the laminate product of my invention.

7. All statements made herein by me of my own knowledge are true, and all statements made on information and belief are believed by me to be true.

8. I am aware that willful false statements and the like made in connection with my above-identified application are punishable by fine or imprisonment, or both (18 U.S.C. §1001), and may jeopardize the validity of the application or any patent issuing thereon.

  
George B. Byma

Date: 3/01/07



FOR IMMEDIATE RELEASE: (11/14/06)

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## SPE® AUTOMOTIVE DIVISION ANNOUNCES 2006 WINNERS OF AUTOMOTIVE INNOVATION AWARDS COMPETITION

**TROY, (DETROIT) MICH.** – At its 36<sup>th</sup>-annual *Automotive Innovation Awards Gala* on November 13, the Automotive Division of the Society of Plastics Engineers (SPE®) International announced category and **Grand Award** winners for this year's *Most Innovative Use of Plastics* competition. The competition is the oldest and largest recognition event in the automotive and plastics industries, and the gala is considered to be among the best networking opportunities in the North American automotive communities. The gala event is typically attended by over 800 transportation and plastics industry leaders, engineers, and media.

This year's **Grand Award Winner**, as well as **Body Exterior** category winner was the **BLOW-MOLDED FRONT & REAR BUMPER SYSTEM** on the '07 Model Year (MY) **Chrysler Group Jeep® Wrangler SUV**. This was the first Class-A blow-molded, all-plastic bumper that combined fascia and beam functionality. It replaced a traditional steel application and offered a 12% piece-cost and assembly-cost reduction as well as a 9% weight reduction. Furthermore, the design meets domestic impact performance and European safety requirement while complying with OEM styling objectives. Contributing team members included:

- o System Supplier: ABC Group Inc.
- o Material Processor: ABC Group Inc.
- o Material Supplier: Salflex Polymers (ABC Group)
- o Resin: Salflex® 610 MW - RXF TPO
- o Tooling Supplier: Supreme Tooling (ABC Group)

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*SPE Announces Winners of 36<sup>th</sup>-Annual Innovation Awards Competition*  
2-2-2-2

The winner in the **Body Interior** category was the **IN-LINE COMPOUNDED STRUCTURAL DUCT ASSEMBLY** featured on the '07 **MY Chrysler Group Dodge Nitro SUV**. This is the first application of in-line compounding / injection molding for a 2-piece, vibration-welded instrument panel structural-duct assembly. The thermoplastic polyolefin (TPO) IP retainer (base panel) is subsequently welded to the structural duct, which has a Class-A finish. Overall assembly cost savings due to materials usage (polypropylene (PP) vs. polycarbonate / acrylonitrile butadiene styrene (PC/ABS)) is approximately 15%. The nominating team included:

§ System Supplier: Intertec Systems  
§ Material Processor: Intertec Systems  
§ Material Supplier: Basell Polyolefins  
§ Resin: Profax<sup>®</sup> SG853 polypropylene  
§ Tooling Supplier: Phillips Tool & Mould Limited

In the **Chassis / Hardware** category, the winner was the **RAIL-LESS WINDOW REGULATOR** also on the '07 **MY Chrysler Group Dodge Nitro SUV** – Description: This is the first integrated, cable-driven, rail-less window regulator system for door modules. The innovative carrier integrates the drum housing and utilizes an industry-first, robotically extruded thermoplastic seal to form the separation between wet and dry sides. The application achieved a weight savings of 25% as well as a direct cost savings. The team that contributed to this application included:

§ System Supplier: Faurecia Interior Systems  
§ Material Processor: Faurecia Interior Systems  
§ Material Supplier: St. Gobain / ExxonMobil  
§ Resin: Twintex<sup>®</sup> comingled glass / polypropylene roving and polypropylene  
§ Tooling Supplier: Omega

The **Environmental** category winner was the **FIBERGLASS-FREE HEADLINER** on the '07 **MY Honda Motor Company Honda<sup>®</sup> Acura<sup>®</sup> MDX SUV**. This application uses a non-glass-fiber reinforcement, which enables complete disposal (incineration) of the headliner by the OEM vehicle recycler. Incinerating fiberglass headliners causes huge disposal issues, especially in Japan and Europe. The basalt-reinforced PP composite meets the OEM's disposal requirements without incinerator contamination issues. The key team members for this development include:

§ System Supplier: M-Tek, Inc.  
§ Material Processor: M-Tek, Inc.  
§ Material Supplier: Azdel, Inc.  
§ Resin: VolcaLite<sup>™</sup> basalt-reinforced PP composite  
§ Tooling Supplier: not available

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*SPE Announces Winners of 36<sup>th</sup>-Annual Innovation Awards Competition*  
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The winning nomination for this year's **Materials** category was the **THERMOPLASTIC VULCANIZATE (TPV) PRIMARY SEAL** on the **'07 MY Chrysler Group Dodge Ram pickup**. This application is the first TPV body-mounted primary seal used in a complete dynamic-sealing application. The new TPV material used for this application is an EPDM-sponge equivalent that enables the transition from thermoset rubber to thermoplastic elastomer. Estimated cost savings of 20% were achieved. The company responsible for this development was:

ξ System Supplier: JYCO  
ξ Material Processor: JYCO  
ξ Material Supplier: JYCO  
ξ Resin: JyFlex™ thermoplastic vulcanizate (TPV)  
ξ Tooling Supplier: JYCO

For the **Performance & Customization** category, which captures aftermarket innovations and was added to the competition two years ago, the winning entry was the **FLUSH REAR CENTER SLIDING WINDOW ASSEMBLY** on the **'07 MY General Motors GMT800 pickups**. This flush rear center sliding window assembly provides a pleasing aesthetic appearance for pickups due to a flush-mounted, concealed window opening. A patent-pending molded bulb seal provides a leak-resistant barrier and an excellent leak-proof water-management system. The development can be applied to other OEM pickups thanks to the efforts of:

ξ System Supplier: Guardian Automotive Products  
ξ Material Processor: Guardian Automotive  
ξ Material Supplier: DuPont Automotive  
ξ Resin: Rynite® 530 BK503 polyethylene terephthalate (PET)  
ξ Tooling Supplier: not available

In the **Powertrain** category, the 2006 winner is the **COMBINED WIDEBAND TURBO RESONATOR** featured on the **'07 MY Chrysler Group Dodge Nitro SUV**. Turbo whine as well as blade-pass noise is no longer audible on vehicle interiors or exteriors due to this first-ever combination resonator mounted on the pressure side of the turbocharger. The in-line mounted, single-housing resonator provides wideband frequency attenuation. The combination of position and attenuation level saves about 60% in mass and materials vs. alternate methods of quieting turbocharged vehicles. Contributors to this innovation included:

ξ System Supplier: Woco MAS USA Inc.  
ξ Material Processor: Novoplas  
ξ Material Supplier: DuPont Automotive  
ξ Resin: Zytel® 70G33 33% glass-filled polyamide (PA (nylon)) 6.6  
ξ Tooling Supplier: Novoplas

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*SPE Announces Winners of 36<sup>th</sup>-Annual Innovation Awards Competition*  
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In the **Process / Assembly / Enabling Technologies** category, the winning application for 2006 was the **FREE-FORM (2-SHOT) DOOR BOLSTER** featured on the '07 **MY Chrysler Group Dodge Caliber SUV**. This process combines a structural substrate (polypropylene) and a soft-feel outer surface (styrene-ethylene-butylene-styrene (SEBS) elastomer) in a single high-pressure molding operation. Creative surface designs that can intermix different colors, haptics, thicknesses, and textures are used to produce a single, more-cost-effective part while also providing the perception of a more expensive component. Cost savings of 10-20% and weight savings of 15% were realized. This innovation was made possible through the efforts of:

- ξ System Supplier: Lear Corporation
- ξ Material Processor: Lear Corporation - Greencastle
- ξ Material Supplier: Kraiburg
- ξ Resin: Thermolast K<sup>®</sup> HTP8679/33 polypropylene and styrene ethylene butylene styrene (SEBS (TPE-S)) elastomer
- ξ Tooling Supplier: Hi-Tech

The winner in the newest category in the **Innovation Awards Competition – Safety**, added last year – was the **FULLY STRUCTURAL BLOW-MOLDED SEATBACKS** on the '07 **MY Audi AG Audi<sup>®</sup> TT roadster**. These all-plastic, blow-molded PC / ABS seatbacks meet strict European safety legislation, including ECE 17 luggage retention, as well as other globally mandated requirements. Because the PC / ABS blow-molded seatbacks replaced metal, a significant weight savings of almost 2.3 kg (5 lb) / vehicle was realized as well as a cost savings of \$4 USD / vehicle. The winning team included:

- ξ System Supplier: Lear Corporation
- ξ Material Processor: Moellertech GmbH
- ξ Material Supplier: Dow Automotive
- ξ Resin: PULSE<sup>™</sup> 2200 BG polycarbonate / acrylonitrile butadiene styrene (PC/ABS)
- ξ Tooling Supplier: not available

In the last nomination category – **Hall of Fame**, for applications in continuous use for at least 15 years – the winner was the **THERMOPLASTIC FRONT GRILLE** on the '66 **MY General Motors Pontiac<sup>®</sup> Bonneville<sup>®</sup>, Catalina<sup>®</sup>, and Tempest<sup>®</sup> vehicles**. The front grilles on these 1966 Pontiac models were the first thermoplastic parts to be used on the exterior of automobiles. The material used was painted acrylonitrile butadiene styrene (ABS) supplied by the then Marbon Chemical Division of BorgWarner. The application was used across all models in the Pontiac Bonneville, Catalina, and Tempest vehicle lines, saving 6.4 - 8.2 kg (14 - 18 lb) per vehicle. (Actual part mass was 1.8 kg (4 lb).) In the words of Josh Madden, SPE Emeritus and then-design engineer at Pontiac, "This single step into the world of thermoplastics on automobiles was the harbinger of the myriad common parts we now take for granted. In fact, there isn't a car on the market today that doesn't have a plastic grille. That's why we selected it to be our 2006 **Hall of Fame** award winner." Key team members on that original launch included: Duane Miller (Pontiac Design Engineering), Josh Madden (Pontiac Materials Engineering), Bob Carroll (GM - Ternstedt), and Len Becker and Fred Garnham (Perfect Mold). Management support at GM came from Pete Estes, John DeLorean, Herman Kaiser, and Ken Valentine. Other key team members for this innovation included:

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*SPE Announces Winners of 36<sup>th</sup>-Annual Innovation Awards Competition*  
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- ξ System Supplier: Millington Plastics Co. (Upper Sandusky, Ohio) and GM Ternstedt Division (Syracuse, N.Y.)
- ξ Material Processor: Millington Plastics Co. and GM Ternstedt Division
- ξ Material Supplier: Marbon Chemical Division of BorgWarner (subsequently sold to GE Plastics)
- ξ Resin: CYCOLAC® H painted acrylonitrile butadiene styrene (ABS)
- ξ Tooling Supplier: Perfect Mold (later The Becker Group) and GM Ternstedt

SPE's *Innovation Awards Gala* is the largest competition of its kind in the world. Dozens of teams made up of OEMs, tier suppliers, and polymer producers submit nominations describing their part, system, or complete vehicle module and why it merits the claim as *Year's Most Innovative Use of Plastics*. This annual event typically draws over 800 OEM engineers, automotive and plastics industry executives, and media. As is customary, funds raised from this event will be used to support SPE educational efforts and technical seminars, which will help to secure the role of plastics in the advancement of the automobile.

The mission of SPE International is to promote scientific and engineering knowledge relating to plastics worldwide and to educate industry, academia, and the public about these advances. SPE's Automotive Division is active in educating, promoting, recognizing, and communicating technical accomplishments for all phases of plastics and plastic based-composite developments in the global transportation industry. Topic areas include applications, materials, processing, equipment, tooling, design, and development.

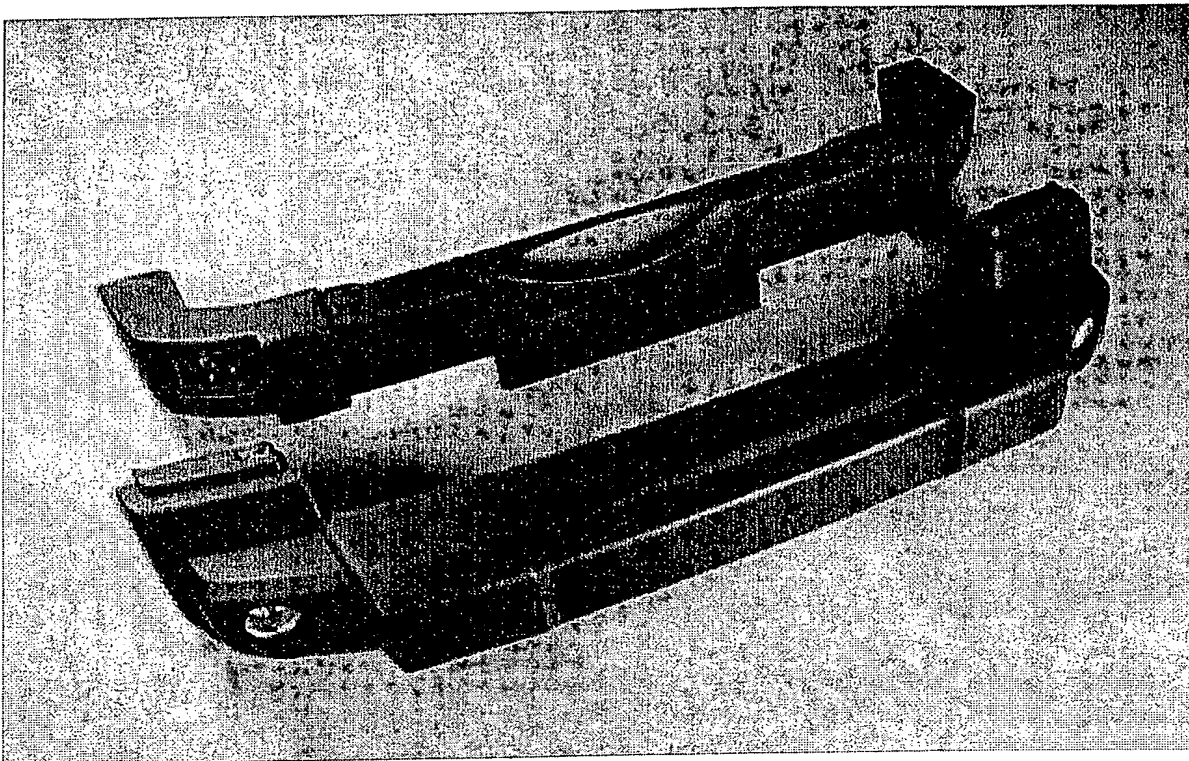
For more information about the *SPE Innovation Awards Gala*, visit the SPE Automotive Division's website at [www.speautomotive.com](http://www.speautomotive.com), or contact the group at +1.248.244.8993, or write SPE Automotive Division, 1800 Crooks Road, Suite A, Troy, MI 48084, USA.

For more information on the Society of Plastics Engineers International or other SPE events, visit the SPE website at [www.4spe.org](http://www.4spe.org), or call +1.203.775.0471.

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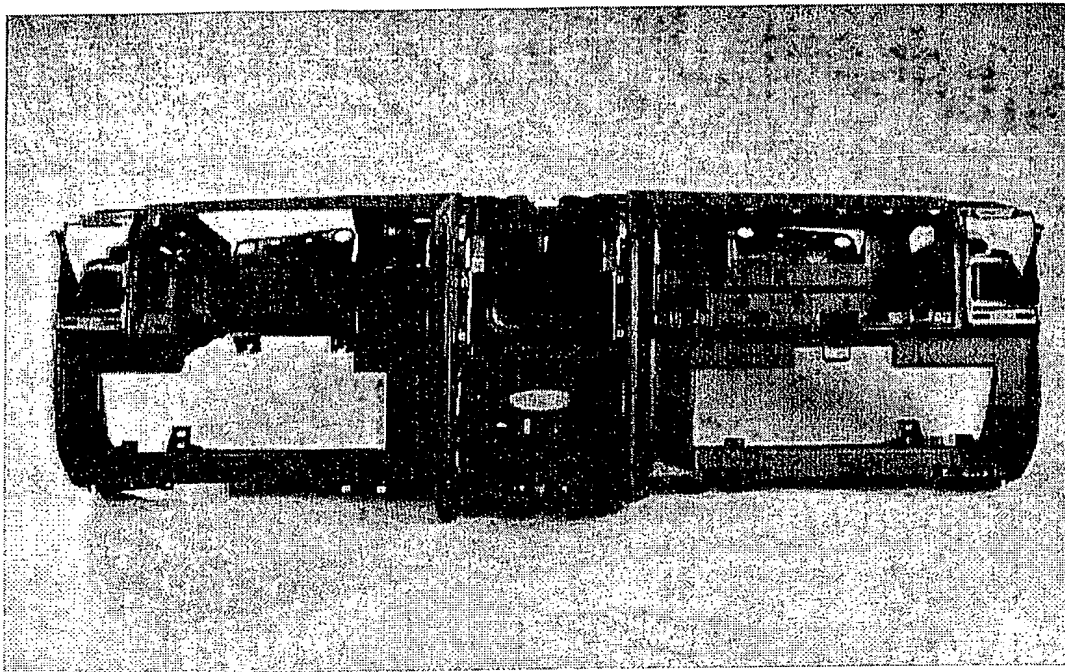
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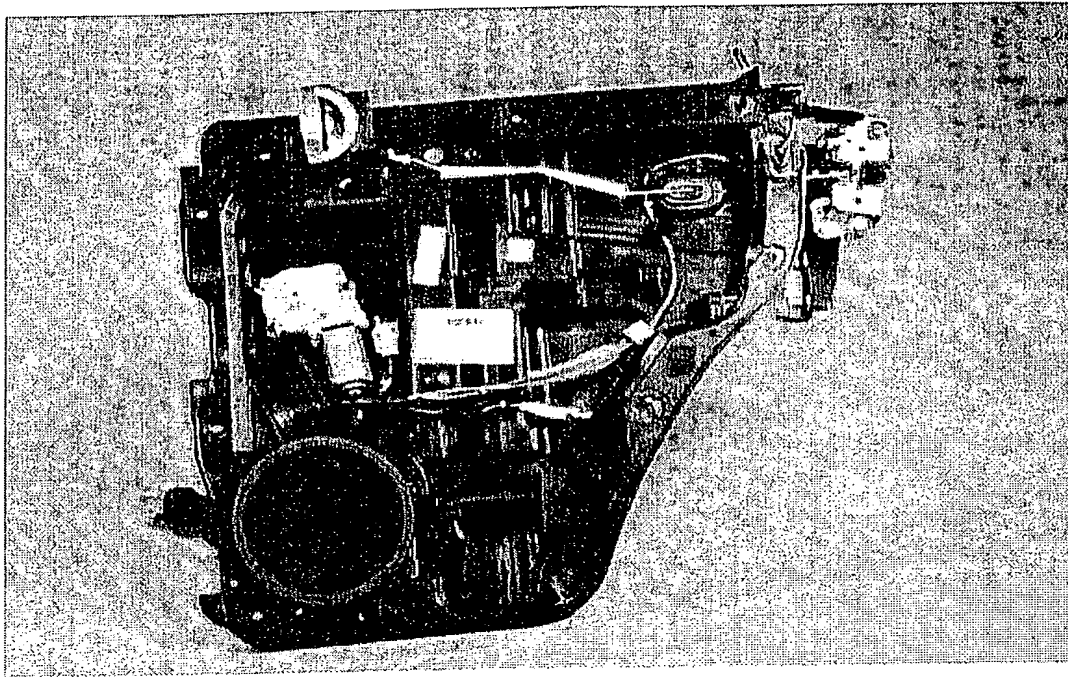
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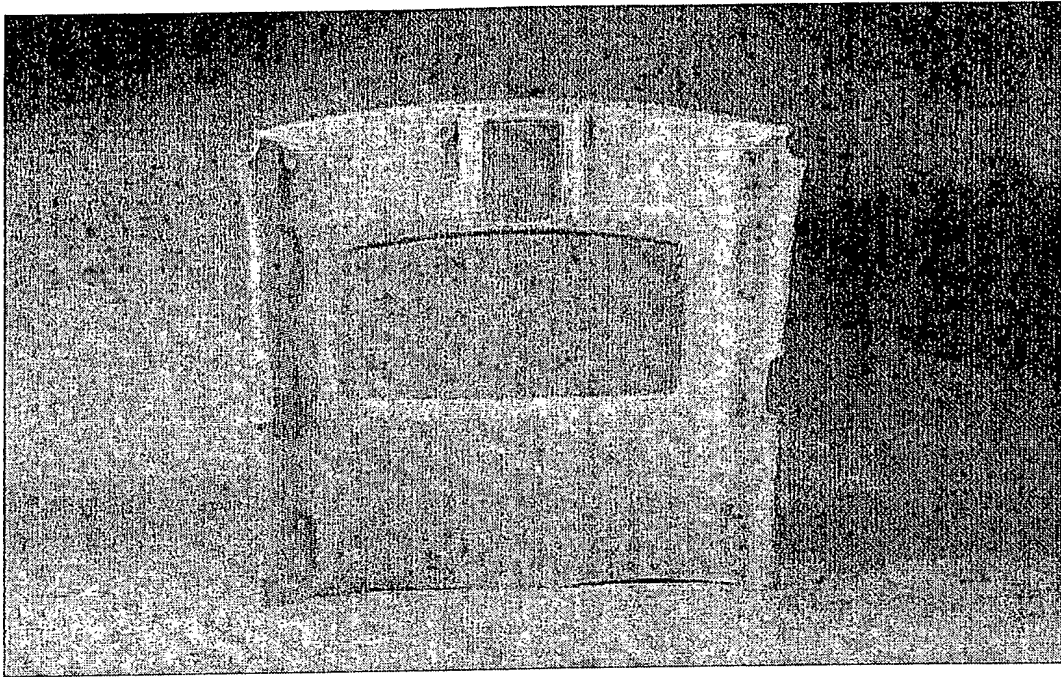
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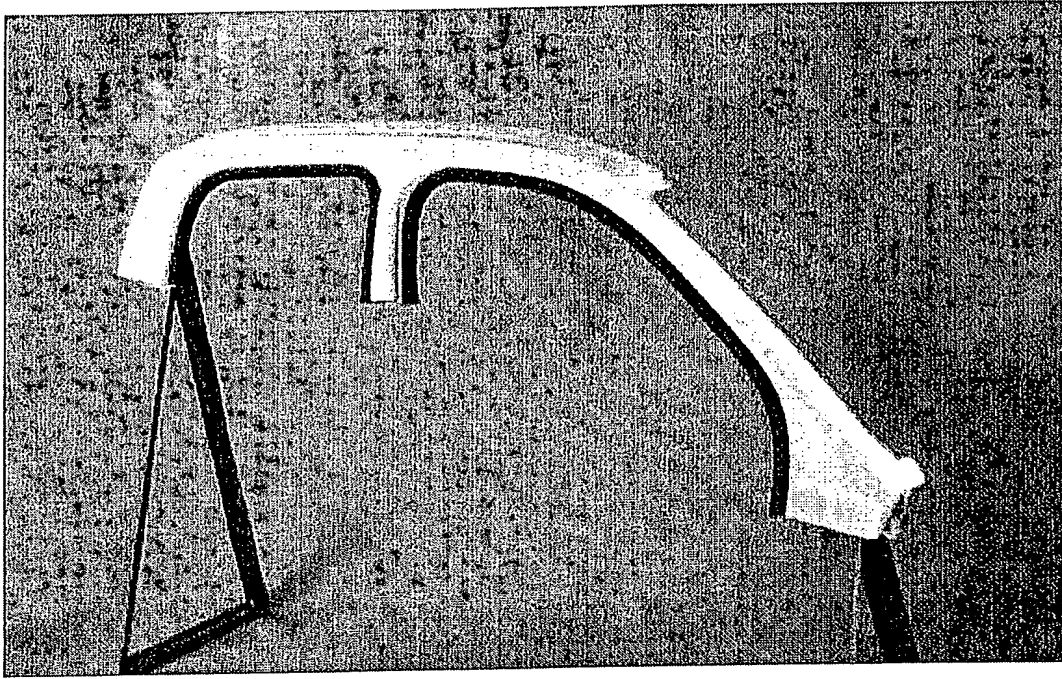
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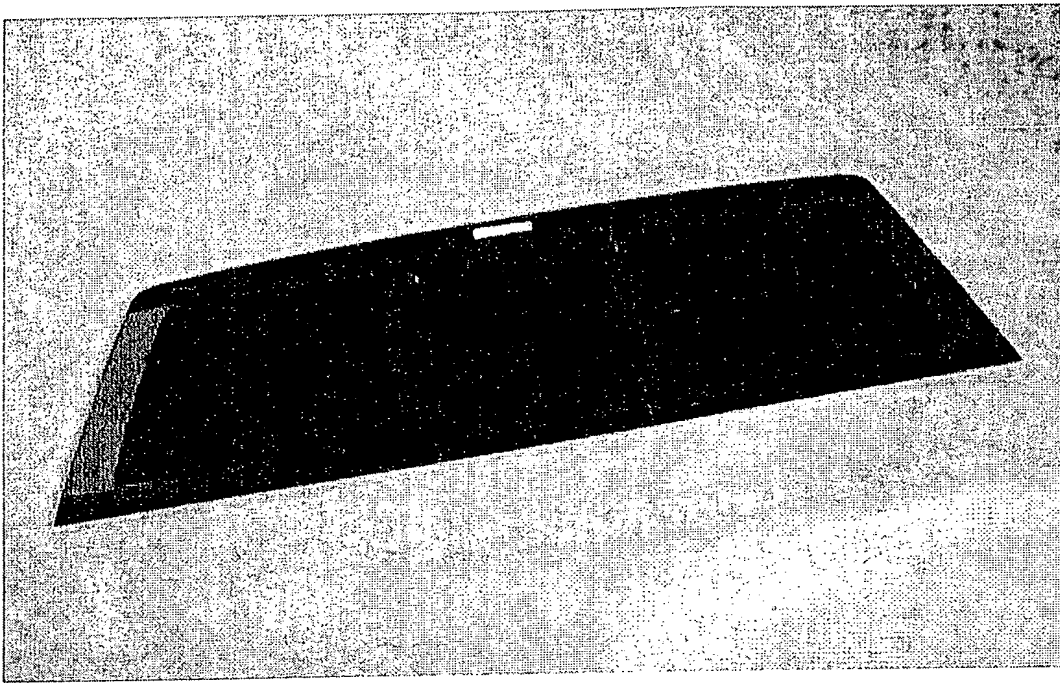
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**TROY, (DETROIT) MICH.** – For the *Performance & Customization* category, which captures aftermarket innovations and was added to the *SPE® Automotive Innovation Awards Competition* two years ago, the winning entry was the **FLUSH REAR CENTER SLIDING WINDOW ASSEMBLY** on the **'07 MY General Motors GMT800 pickups**. This flush rear center sliding window assembly provides a pleasing aesthetic appearance for pickups due to a flush-mounted, concealed window opening. A patent-pending molded bulb seal provides a leak-resistant barrier and an excellent leak-proof water-management system. The development can be applied to other OEM pickups as well.

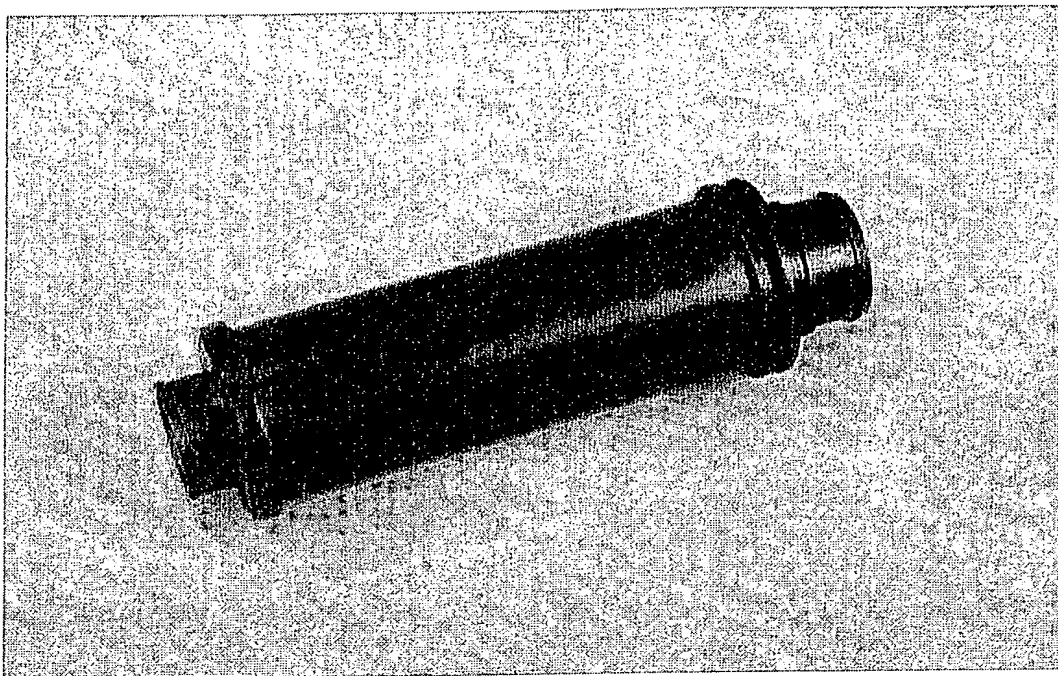
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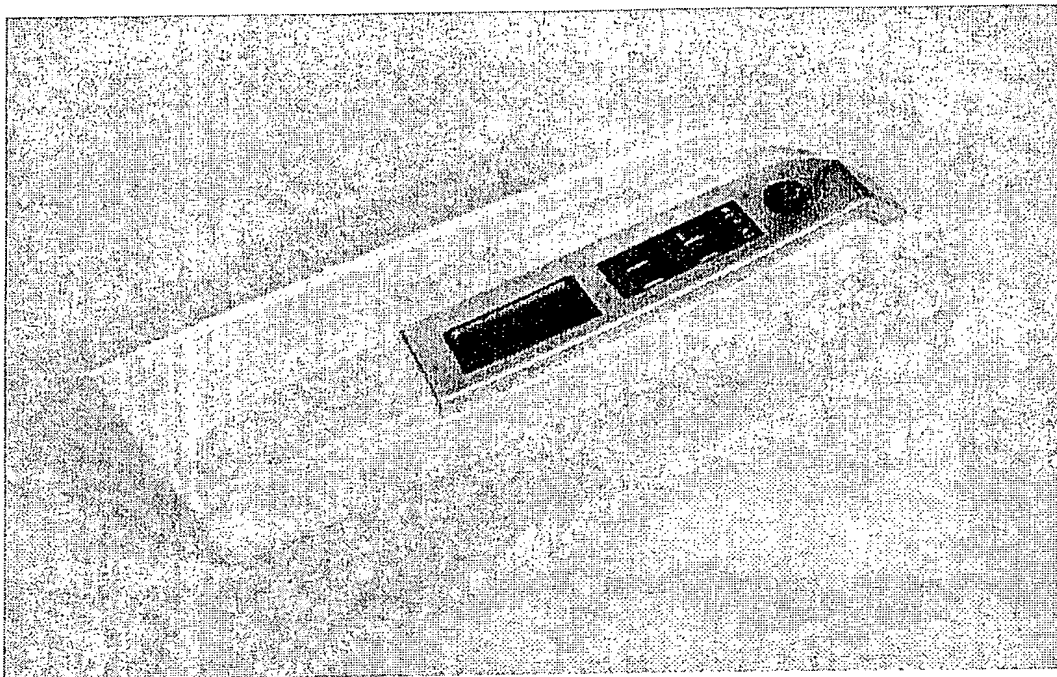
**TROY, (DETROIT) MICH.** – In the *Powertrain* category, the 2006 **SPE® Automotive Innovation Awards Competition** winner is the **COMBINED WIDEBAND TURBO RESONATOR** featured on the '07 *MY Chrysler Group Dodge Nitro SUV*. Turbo whine as well as blade-pass noise is no longer audible on vehicle interiors or exteriors due to this first-ever combination resonator mounted on the pressure side of the turbocharger. The in-line mounted, single-housing resonator provides wideband frequency attenuation. The combination of position and attenuation level saves about 60% in mass and materials vs. alternate methods of quieting turbocharged vehicles.

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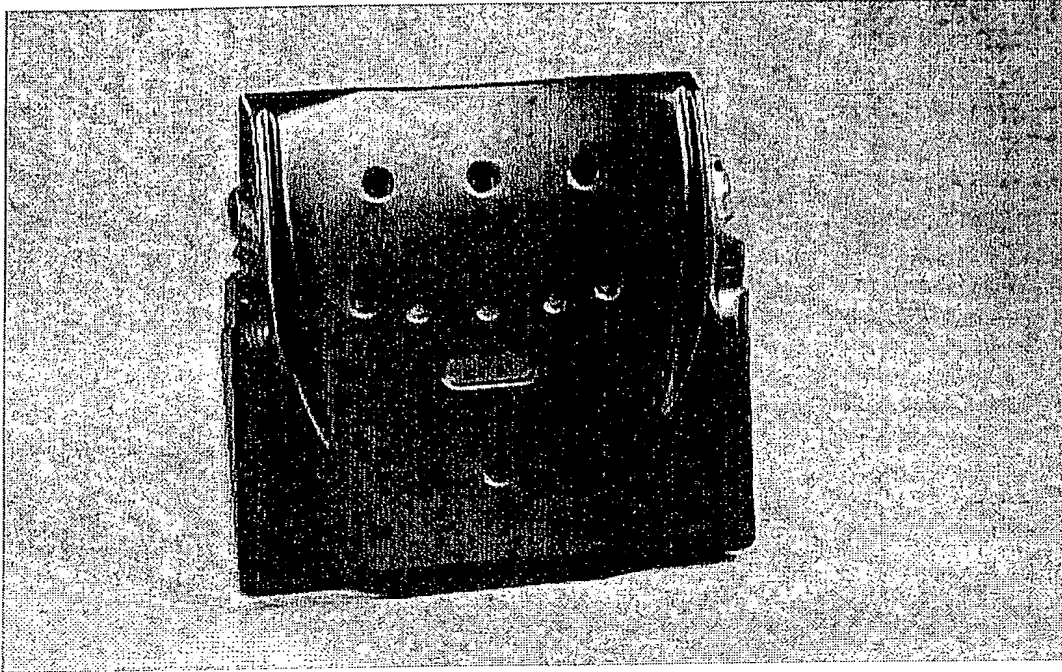
**TROY, (DETROIT) MICH.** – For the *Process / Assembly / Enabling Technologies* category of the **SPE® Automotive Innovation Awards Competition**, the winning application for 2006 was the **FREE-FORM (2-SHOT) DOOR BOLSTER** featured on the '07 *MY Chrysler Group Dodge Caliber SUV*. This process combines a structural substrate (polypropylene) and a soft-feel outer surface (styrene-ethylene-butylene-styrene (SEBS) elastomer) in a single high-pressure molding operation. Creative surface designs that can intermix different colors, haptics, thicknesses, and textures are used to produce a single, more-cost-effective part while also providing the perception of a more expensive component. Cost savings of 10-20% and weight savings of 15% were realized.

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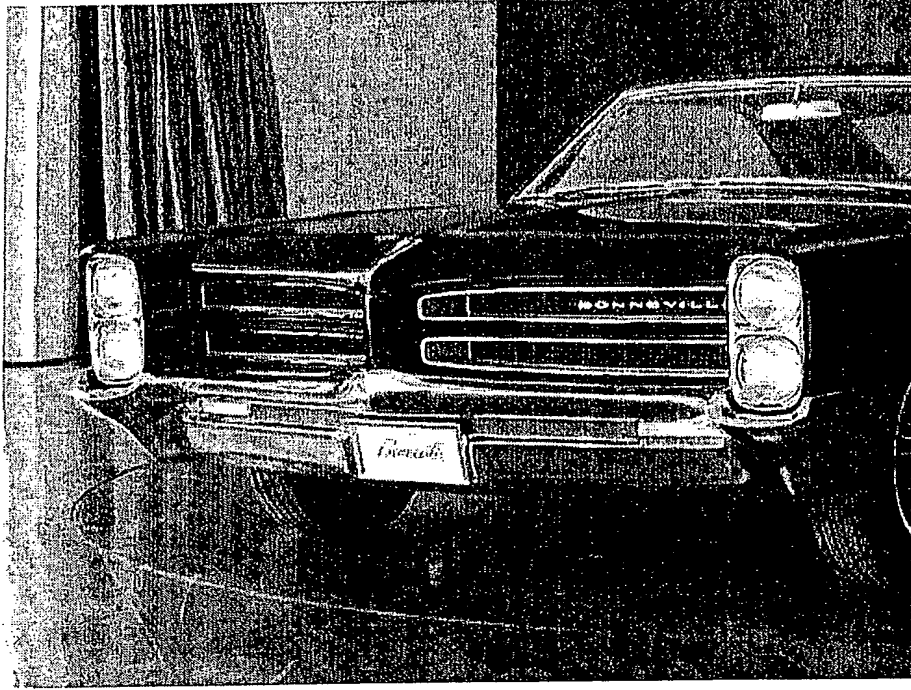
**TROY, (DETROIT) MICH.** – The winner in the newest category in the *SPE® Automotive Innovation Awards Competition – Safety*, added last year – was the **FULLY STRUCTURAL BLOW-MOLDED SEATBACKS** on the '07 *MY Audi AG Audi®TT roadster*. These all-plastic, blow-molded PC / ABS seatbacks meet strict European safety legislation, including ECE 17 luggage retention, as well as other globally mandated requirements. Because the PC / ABS blow-molded seatbacks replaced metal, a significant weight savings of almost 2.3 kg (5 lb) / vehicle was realized as well as a cost savings of \$4 USD / vehicle.

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**TROY, (DETROIT) MICH.** – In the last nomination category – *Hall of Fame*, for applications in continuous use for at least 15 years – the **SPE® Automotive Innovation Awards Competition** winner was the **THERMOPLASTIC FRONT GRILLE** on the '66 MY General Motors Pontiac® Bonneville®, Catalina®, and Tempest® vehicles. The front grilles on these 1966 Pontiac models were the first thermoplastic parts to be used on the exterior of automobiles. The material used was painted acrylonitrile butadiene styrene (ABS) supplied by the then Marbon Chemical Division of BorgWarner. The application was used across all models in the Pontiac Bonneville, Catalina, and Tempest vehicle lines, saving 6.4 - 8.2 kg (14 - 18 lb) per vehicle. (Actual part mass was 1.8 kg (4 lb).)

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